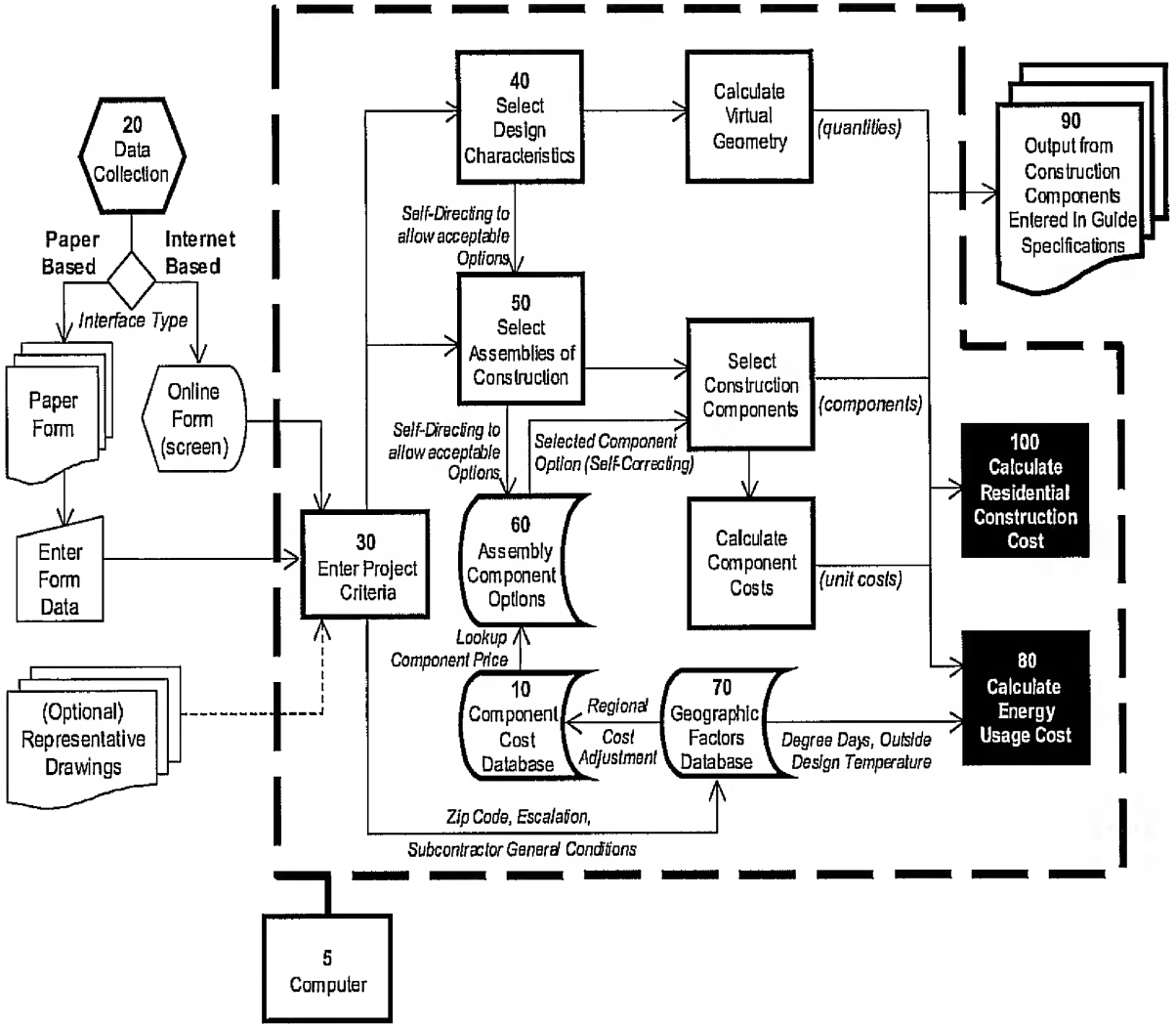
20
Data
Collection
Paper
Based
Internet
Based
Interface Type
Paper
Form
Online
Form
(screen)
Enter
Form
Data
(Optional)
Representative
Drawings
30
Enter Project
Criteria
40
Select
Design
Characteristics
Calculate
Virtual
Geometry
(quantities)
90
Output from
Construction
Components
Entered In Guide
Specifications
Self-Directing to
allow acceptable
Options
50
Select
Assemblies of
Construction
Select
Construction
Components
(components)
Self-Directing to
allow acceptable
Options
Selected Component
Option (Self-Correcting)
100
Calculate
Residential
Construction
Cost
60
Assembly
Component
Options
Calculate
Component
Costs
(unit costs)
Lookup
Component Price
80
Calculate
Energy
Usage Cost
10
Component
Cost
Database
Regional
Cost
Adjustment
70
Geographic
Factors
Database
Degree Days, Outside
Design Temperature
Zip Code, Escalation,
Subcontractor General Conditions
5
Computer

FIGURE 1

IT PRICE CATALOG		Location Factor:	0.94	MASTER [BASELINE] RCM		
		Sales Tax:	6.0%	Berrien City, MI		
002 Project Planning & Management, Inc.		Ave Sub Gen'l Conditions:	2%	Cost Adjustments		
System	Description	Base Unit Cost	Adjusted Unit Cost	Unit	Loc_Fctr	S_Tax	Sub_GC
col_sprd_ftg	3000 PSI concrete						
1	forms, rebar, concr, placing, finish	$204.00	$201.35	CY	0.94	3%	2%
sprd_ftg	3000 PSI concrete						
1	Not Req'd (Trench Footing)	$0.00	$0.00	LF			
2	12" thick x 18" wide; forms, reinf, direct chute	$12.06	$11.90	LF	0.94	3%	2%
3	12" thick x 24" wide; forms, reinf, direct chute	$13.71	$13.53	LF	0.94	3%	2%
4	(For Precast Foundations) 12" thick x 24" wide; 3/4" stone bedding	$2.22	$2.19	LF	0.94	3%	2%
fdn_drain							
1	PVC 4" dia; gravel drain bed	$4.00	$3.95	LF	0.94	3%	2%
2	PVC 6" dia; gravel drain bed	$5.00	$4.94	LF	0.94	3%	2%
fdn_wall	4' high foundation wall	(deduct of 4*$0.70 eliminates 1" rigid insul)					
1	Poured-8"; bitum/damp; sill plates	$20.44	$20.17	LF	0.94	3%	2%
2	Poured-10"; bitum/damp; sill plates	$23.60	$23.29	LF	0.94	3%	2%
3	Poured-10"; brickledge; bitum/damp; sill plates	$31.16	$30.75	LF	0.94	3%	2%
4	Poured-12"; bitum/damp; sill plates	$26.08	$25.74	LF	0.94	3%	2%
5	Poured-12"; brickledge; bitum/damp; sill plates	$33.64	$33.20	LF	0.94	3%	2%
6	Block-8", grouted; bitum/damp; parging; sill plates	$37.84	$37.35	LF	0.94	3%	2%
7	Block-10", grouted; bitum/damp; parging; sill plates	$42.44	$41.89	LF	0.94	3%	2%
8	Block-12", grouted; brickledge; parging; bitum/damp; sill plates	$47.28	$46.67	LF	0.94	3%	2%
9	Pre-Cast Wall System, bitum/damp; sill plates	$22.80	$22.50	LF	0.94	3%	2%
10	ICF (Insulated Concrete Foundation); sill plates	$32.70	$32.28	LF	0.94	3%	2%
11	Trench footing/grade beam;12" poured/reinf; earth formed; no insul	$21.76	$21.48	LF	0.94	3%	2%
12	Wood 2x8; 16"OC; CDX sheathing; vapor; 9" insul R-30	$24.04	$23.73	LF	0.94	3%	2%

FIGURE 2

SECTION 7: BUILDING SYSTEMS

This final section will explore and document your quality expectations for various building systems in your new home. These decisions are important as they will directly affect the construction budget. In addition, building envelope selections (walls, roof, windows, insulation) will also impact energy heat loss calculations.

01 Foundation

011 Standard Foundations

☐ Sand/Gravel Soil ☐ Sand/Clay Soil ☐ Problem Soils *(e.g., water; low soil bearing capacity)*

02 Substructure

021 Slab on Grade

☐ 4" thick (standard) ☐ 5" thick ☐ 6" thick

022 Excavation: Basement

☐ No Basement ☐ Crawlspace

☐ Full Basement ☐ Partial Bsmt (some of Ground Floor living area on slab)

023 Basement Walls

Wall Material ☐ Poured concrete ☐ Concrete block/parging ☐ Wood foundation

☐ "Superior" Precast Foundation Wall System w/1" insulation

Waterproofing ☐ Standard Protection ☐ Premium Protection

Insulation ☐ None ☐ 1" Rigid (R-5) ☐ 2" Rigid (R-10) ☐ 3" Rigid (R-15)* (recommended)
**Energy Star*

03 Superstructure

031 Floor Construction

NOTE: Priced from least to most expensive per SF of floor system (left to right)

☐ 1 Composition "I" Joists *(Standard spans to 24')* * 1" x 3" Ceiling furring not required*

☐ 2 Dimension lumber (e.g. 2x12) *(Standard spans to 19')* * Material readily available*

☐ 3 Truss Joists *(Standard spans to 24')* * Utilities easily pass through*

032 Roof Construction

House ☐ SIP / Timber Frame ☐ Prefab trusses ☐ Dimensional lumber (e.g. 2x10)

Garage ☐ SIP / Glu Lam Ridge Beam ☐ Prefab trusses ☐ Dimensional lumber (e.g. 2x10)

Dormers ☐ SIP ☐ Dimensional lumber (e.g. 2x8)

SIP Thickness ☐ SIP Not Used ☐ 8.25" OSB/OSB (R-34) ☐ 10.25" OSB/OSB (R-42)

☐ 4.5" OSB/OSB (R-18) ☐ 6.5" OSB/OSB (R-27) ☐ 12.25" OSB/OSB (R-45)

SIP Interior Finish ☐ 1/2" Gypsum Board ☐ Tongue & Groove "T&G" (pine or cedar)

033 Stair Construction

Basement Stair ☐ Basement stairs, open riser ☐ Pine treads/risers, box stairs, WALLS 2 SIDES/handrail only

☐ Pine treads/risers, box stairs, balusters/handrail, newel post

Ground Floor Stair ☐ Pine treads / risers (pine), box stairs, balusters/handrail, newel post

☐ Hardwood treads / risers, box stairs, WALLS 2 SIDES, balusters/handrail, newel post

☐ Hardwood treads / risers, box stairs, balusters/handrail, newel post

☐ Curved stairway (hardwood), open 1 side ☐ Curved stairway (hardwood), open 2 sides

Auxiliary Stair ☐ None ☐ Attic stair; folding; pine; 8'-6"

☐ Pine treads / risers (pine), box stairs, handrail, newel post ☐ Spiral stairs, oak

☐ Hardwood treads / risers, box stairs, handrail, newel post ☐ Spiral stairs, metal

FIGURE 3

ZIP CODE	CITY	STATE	Regional Adjustment Factor	Winter Design Temp		Deg Days	Deg Days	Sales Tax	Sub GC	Escalation
				99%	97.5%	Heating DD	Cooling DD	Tax Rate	2%	1.50%
35000	Cullman	AL	0.85	17	21	2,823	1,881	4%		
35200	Birmingham	AL	0.86	17	21	2,823	1,881	4%		

FIGURE 4

Enter:	State	Residential Energy Code	State Mandate	Comments
MI	Michigan	Michigan Uniform Energy Code Part 10 Rules, less stringent than 1992 MEC	Yes	Prior to June 22, 1977, the state of Michigan had no building energy efficiency requirements. On July 27, 1985, the state adopted ANSI/ASHRAE/IES Standard 90A-1980 statewide. SB 719, signed in early January 1996, repealed the 1995 adoption of the 1993 MEC. The legislation directed the state construction code commission to, by April 1, 1997, provide cost-effective standards and establish a program to provide home buyers with energy rating information. The Michigan Uniform Energy Code Part 10 Rules were adopted March 31, 1999.

Envelope Heat Loss	Area (SF)	R-Value	U Factor	Delta T	Heat Loss (BTUH)
Heat Loss-Basement Walls	1,624	6	0.16	22	6,359
Heat Loss-Basement Floor (or Ground Flr Slab)	3,198	25	0.04	22	2,814
Heat Loss-Walkout Wall	1,500	14	0.07	69	7,565
Heat Loss-Walls	448	14	0.07	69	2,206
Heat Loss-Windows (low-E) Default (R-3)	585	3	0.33	69	13,455
Heat Loss-Windows Standard Glazing (R-2)	0	2	0.50	69	-
Heat Loss-Windows (low-E) Triple Glaze (R-6)	0	6	0.17	69	-
Heat Loss-Doorwalls	126	3	0.33	69	2,898
Heat Loss-Doorwalls	0	3	0.33	69	-
Heat Loss-Doors	84	5	0.20	69	1,159
Heat Loss-Roof SIP (on Timber)	1,283	36	0.03	69	2,439
Heat Loss-Roof SIP (on SIP)	0	0	0.00	69	-
Heat Loss-Attic (Uninsulated Roof Rafters)	547	16	0.06	69	2,383
Heat Loss-Skylights	0	3	0.33	69	-
			Building Envelope Heat Loss		41,260 BTUH

3	97.5%-99% Design Dry Bulb Temp (deg F)
72	Indoor Design Temp (deg F)
69	Delta T

Envelope Tightness

Select > 4 Energy Star Very Tight 0.25 ACH (Air Changes / Hour) Design Occupancy: 5

Infiltration / Ventilation	CFM	ACH	Constant	Volume	Delta T	Heat Loss (BTUH)
Natural Infiltration	303	0.25	1.08	72,764	69	22,593
Mechanical Ventilation w/AAUX	424	0.35	1.08	72,764	18	8,251
75% AAUX Efficiency	141.09	Min Target CFM				

72,113	Total BTUH Domand
1.4	Furnace Sizing Factor
127,000	Furnace Size at 80%
	Meets Energy Star:
113,000	Furnace Size at 90%
100,000	Furnace Size at 94%
101,000	Furnace Size at 100% (ELECTRIC)

Envelope + Infiltration Heat Loss = 72,113 BTUH

Furnace AFUE = 90% 2 <Select Furnace Eff.

Furnace Size = 80,126 BTUH

Natural Gas	10 therms (10mcf) = 1,000,000 BTU's	
Electricity	293 KWH = 1,000,000 BTU's	
Propane	10.9 Gallons = 1,000,000 BTU's	
Heating Oil	7.21 Gallons = 1,000,000 BTU's	

D = Degree Days = 6,439 Berrien City, MI (per National Climatic Data Center)

T = Temp diff = 69 degrees

V = Fuel value = 1,052 BTUh per cu ft natural gas

V = Fuel value = 91,743 BTUh per Gallon propane

V = Fuel value = 3,413 BTUh per KWH electric

CF1 = 1.36 Correction factor that includes the effects of rated full load efficiency, part load performance, over sizing and energy conservation devices.

CF2 = 0.71 Empirical correction factor for heating effect versus 65 degrees F degrees-days.

E = Annual Energy Consumption =	164,715	cu ft natural gas	$0.58 cost per therm NGAS
	1,889	gallons of propane	$0.0058 cost per CF of nat gas
	-	KWH of electricity (100% Efficiency)	$0.95 cost per gallon Propane
			$0.075 cost per KWH of Electricity (Assumes Average Off Peak and Peak)

Annual Heating Cost =	$955.35	NGAS
Annual Heating Cost =	$1,794.32	PROPANE
Annual Heating Cost =	$0.00	ELECTRIC

FIGURE 5

HOME SPECIFIC QUALITY / COST SELECTIONS
237 System Selections
© 2002 Project Planning & Management, Inc.
Selection Switches
TOTAL FINISHED AREA: 4,778 SF
TOTAL CONSTRUCTED AREA: 8,358 SF
MASTER [BASELINE] RCN
Berrien City, MI
4 Bedroom, 5 Bath

SYSTEM		SUBSYSTEM			quan	unit	unit $	total $	BASELINE TOTAL	Savings
1 Foundation	011 Standard Foundations									
	011.10	Spread footings (timber columns)	1	12" thick-30"x30"; forms, rebar, concrete	9	NCOLS	$46.61	$419	$419	$0
	011.10	Spread footings (tally columns)	1	12" thick-30"x30"; forms, rebar, concrete	5	EA	$46.61	$233	$233	$0
	011.20	Spread footings (foundation walls)	4	12" thick x 24" wide; forms, reinf, direct chute	43	LF	$13.53	$582	$582	$0
	011.20	Spread footings (basement walls)	5	12" thick x 24" wide; forms, reinf, direct chute, PVC 6"gravel drainbed	352	LF	$18.47	$6,506	$6,506	$0
	011.30	Foundation Wall (4' high)	1	Poured-8"; bitum/damp, sill plates	230	LF	$20.17	$4,640	$4,640	$0
	011.40	Excavation: Foundation Wall Footing	2	4' depth spread ftg excav; sand/gravel; backfill, no compctn; rough grade	345	SF	$1.39	$136	$136	$0
	012 Special Foundations		1	No additional special foundations	345	SF	$0.00	$0	$0	$0
2 Substructure	021 Slab on Grade									
	021.00	Ground Floor Slab on Grade	3	Not Used	0	SF	$0.00	$0	$0	$0
	021.00	Garage Floor Slab on Grade	1	4" slab w/4" gravel base; 6 mil vap; expan matl; W1.4/W1.4; steel trowel finis	864	SF	$2.69	$2,328	$2,328	$0
	021.00	Basement Slab on Grade	3	4" slab w/4" gravel base; 6 mil vap; expan matl; W1.4/W1.4; steel trowel finis	3,198	SF	$2.69	$8,617	$8,617	$0
	021.10	Basement Slab Insulation	1	Not Used	0	SF	$0.00	$0	$0	$0
	022 Excavation: Basement		3	Walkout: Sand & gravel excav; backfill; compaction 8" lifts; rough grade	1,066	CY	$5.75	$6,125	$6,125	$0
	022.00	Off Site Trucking	1	Assumes off-site hauling NOT required (Assumes on site placement of spoils)	0	CY	$0.00	$0	$0	
	023 Basement Walls		1	Poured-8"; bitum/damp; sill plates	1,921	BWA	$5.00	$9,643	$9,643	$0
	023.00	Partial Height Basement Wall Framing	1	Not Used	0	BWA	$0.00	$0	$0	$0
	023.10	Basement Wall Insulation	1	None	1,921	BWA	$0.00	$0	$0	$0

Baseline Selections

HOME SPECIFIC QUALITY / COST SELECTIONS
237 System Selections
© 2002 Project Planning & Management, Inc.
Selection Switches
TOTAL FINISHED AREA: 4,778 SF
TOTAL CONSTRUCTED AREA: 8,358 SF
MASTER [BASELINE] RCN
Berrien City, MI
4 Bedroom, 5 Bath

SYSTEM		SUBSYSTEM			quan	unit	unit $	total $	BASELINE TOTAL	Savings
1 Foundation	011 Standard Foundations									
	011.10	Spread footings (timber columns)	1	12" thick-30"x30"; forms, rebar, concrete	9	NCOLS	$46.61	$419	$419	$0
	011.10	Spread footings (tally columns)	1	12" thick-30"x30"; forms, rebar, concrete	5	EA	$46.61	$233	$233	$0
	011.20	Spread footings (foundation walls)	4	12" thick x 24" wide; forms, reinf, direct chute	43	LF	$13.53	$582	$582	$0
	011.20	Spread footings (basement walls)	5	12" thick x 24" wide; forms, reinf, direct chute, PVC 6"gravel drainbed	352	LF	$18.47	$6,506	$6,506	$0
	011.30	Foundation Wall (4' high)	1	Poured-8"; bitum/damp; sill plates	69	LF	$20.17	$1,614	$4,640	($3,026)
	011.40	Excavation: Foundation Wall Footing	2	4' depth spread ftg excav; sand/gravel; backfill; no compctn; rough grade	195	SF	$0.39	$77	$136	($59)
	012 Special Foundations		1	No additional special foundations	195	SF	$0.00	$0	$0	$0
2 Substructure	021 Slab on Grade									
	021.00	Ground Floor Slab on Grade	3	Not Used	0	SF	$0.00	$0	$0	$0
	021.00	Garage Floor Slab on Grade	1	4" slab w/4" gravel base; 6 mil vap; expan matl; W1.4/W1.4; steel trowel finis	864	SF	$2.69	$2,328	$2,328	$0
	021.00	Basement Slab on Grade	3	4" slab w/4" gravel base; 6 mil vap; expan matl; W1.4/W1.4; steel trowel finis	3,198	SF	$2.69	$8,617	$8,617	$0
	021.10	Basement Slab Insulation	1	Not Used	0	SF	$0.00	$0	$0	$0
	022 Excavation: Basement		3	<RESELECT> Must Select '1' or '2'-Full Basement Option	1,066	CY	<RESELECT>	#VALUE!	$6,125	#VALUE!
	022.00	Off Site Trucking	1	Assumes off-site hauling NOT required (Assumes on site placement of spoils)	0	CY	$0.00	$0	$0	
	023 Basement Walls		1	Poured-8"; bitum/damp; sill plates	3,171	BWA	$5.20	$16,792	$9,643	$7,149
	023.00	Partial Height Basement Wall Framing	1	Not Used	0	BWA	$0.00	$0	$0	$0
	023.10	Basement Wall Insulation	1	None	3,171	BWA	$0.00	$0	$0	$0

Alternate Selections illustrating self documenting line item changes to component costs and Self-Correcting feature (Line 022 Basement Excavation) wherein "ERROR" was triggered when "Walkout Basement" was deselected in '40' Design Characteristics, requiring selection of Full Basement excavation options.

FIGURE 6

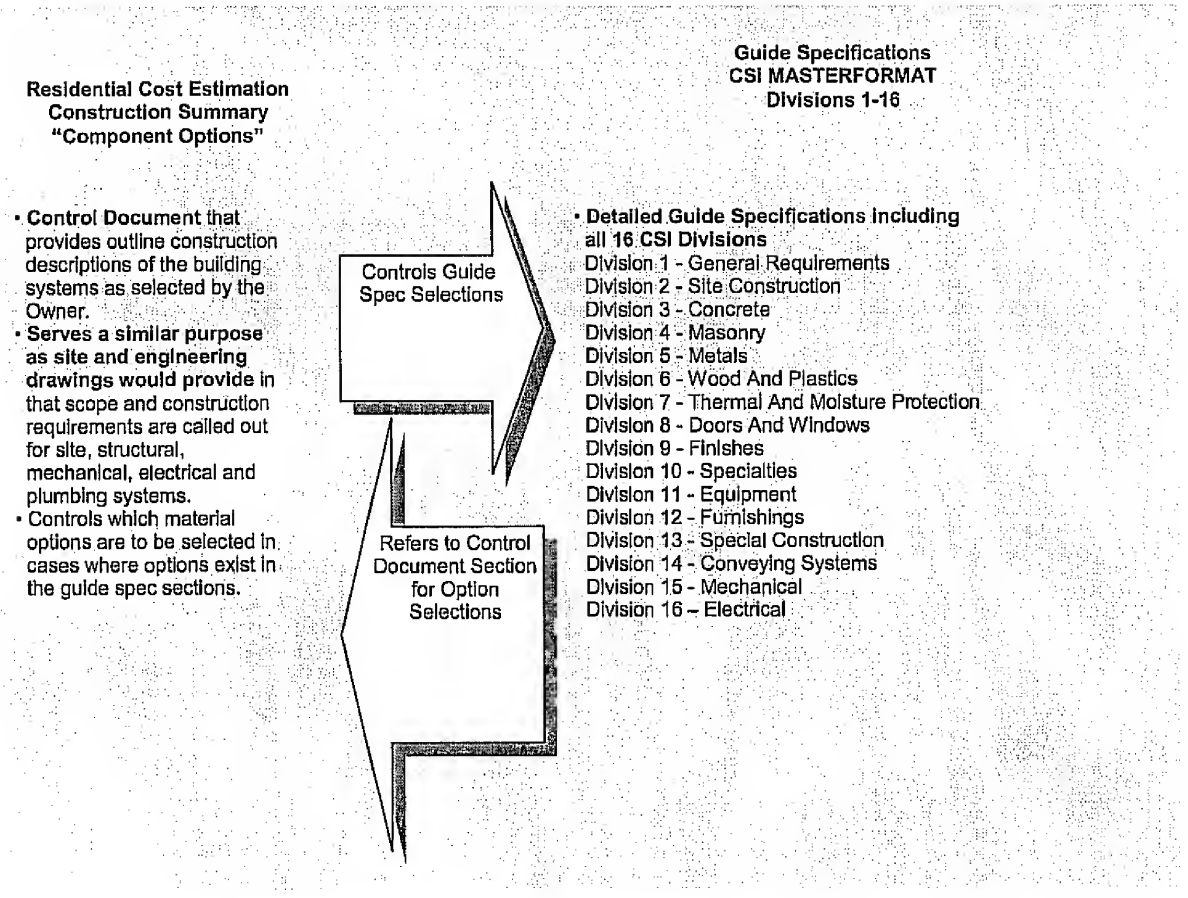
Residential Cost Estimation
Construction Summary
"Component Options"
• Control Document that provides outline construction descriptions of the building systems as selected by the Owner.
• Serves a similar purpose as site and engineering drawings would provide in that scope and construction requirements are called out for site, structural, mechanical, electrical and plumbing systems.
• Controls which material options are to be selected in cases where options exist in the guide spec sections.
Controls Guide Spec Selections
Refers to Control Document Section for Option Selections
Guide Specifications
CSI MASTERFORMAT
Divisions 1-16
• Detailed Guide Specifications including all 16 CSI Divisions
Division 1 - General Requirements
Division 2 - Site Construction
Division 3 - Concrete
Division 4 - Masonry
Division 5 - Metals
Division 6 - Wood And Plastics
Division 7 - Thermal And Moisture Protection
Division 8 - Doors And Windows
Division 9 - Finishes
Division 10 - Specialties
Division 11 - Equipment
Division 12 - Furnishings
Division 13 - Special Construction
Division 14 - Conveying Systems
Division 15 - Mechanical
Division 16 – Electrical

FIGURE 7